

polymeric film adhered to the outer tensile layer, the inner bonding layer further being one which adheres readily to a catheter body using glue adhesion;

- (b) heating said parison to a predetermined temperature and drawing said parison longitudinally;
- (c) radially expanding said parison in a blow molding fixture to establish inflated dimensions;
- (d) wherein steps (b) and (c) are adapted to biaxially orient the material of the tensile layer such that the expander member exhibits a burst strength greater than about seven atmospheres; and
- (e) adhesively bonding the expander to a tubular catheter exterior using an adhesive material.

60. The method of claim 59 wherein, in step (d), steps (b) and (c) are adapted to biaxially orient the material of both the tensile and bonding layer.

61. The method of claim <sup>80</sup>59 wherein the inner bonding layer consists of a material selected from the group consisting of ethylene propylene, ethylene vinylacetate, vinylacetate and ethylene vinyl alcohol (EVA), polyolefins, polyurethane, polyvinyl chloride (PVC), and polysiloxanes (silicones).

62. The method of claim <sup>80</sup>59 wherein the material of the outer layer is selected from the group consisting of ABS (acrylonitrile-butadiene-styrene), ABS/nylon, ABS/polyvinyl chloride (PVC), ABS/polycarbonate and combinations thereof, acrylonitrile

copolymer, polyacrylamide, polyacrylate, polyacrylsulfone, polyethylene terephthalate (PET), polybutylene terephthalate (PBT), polyethylene naphthalate (PEN), liquid crystal polymer (LCP), polyester/polycaprolactone polyester/polyadipate, polyetheretherketone (PEEK), polyethersulfone (PES), polyetherimide (PEI), polyetherketone (PEK), polymethylpentene, polyphenylene ether, polyphenylene sulfide, styrene acrylonitrile (SAN), nylon 6, nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12; and wherein the material of the inner layer is selected from the <sup>group</sup> ~~class~~ consisting of ethylene propylene, ethylene vinylacetate and ethylene vinyl alcohol (EVA), polyolefins, polyurethane, polyvinyl chloride, and polysiloxanes (silicones).

63. The method of claim <sup>80</sup> 59 wherein the material of the outer layer is selected from the group consisting of polyethylene terephthalate (PET), polyethylene naphthalate (PEN), nylon 6, nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12.

64. The method of claim 61 wherein the material of the outer layer is selected from the group consisting of polyethylene terephthalate (PET), polyethylene naphthalate (PEN), nylon 6, nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12.

65. A method of forming a multi-layer expander member and attaching same to an intravascular catheter body comprising the steps of:

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- (a) co-extruding an outer layer and an inner layer, wherein the outer layer consists essentially of a polymeric film exhibiting high tensile strength and low distensibility, and an inner bonding layer consisting essentially of a polymeric film adhered to the outer tensile layer, the inner bonding layer further having a lower melting point than that of said outer tensile layer and said inner bonding layer further being one which adheres readily to a catheter body using melt bonding;
  - (b) heating said parison to a predetermined temperature and drawing said parison longitudinally;
  - (c) radially expanding said parison in a blow molding fixture to establish inflated dimensions;
  - (d) wherein steps (b) and (c) are adapted to biaxially orient the material of both the tensile layer and the inner bonding layer such that the expander member exhibits a burst strength greater than about seven atmospheres; and
  - (e) attaching said expander to said catheter body by melt bonding of said inner layer.

F 66. The method of claim <sup>82</sup>~~65~~ wherein the inner bonding layer consists of a material selected from the group consisting of ethylene propylene, ethylene vinylacetate, vinylacetate and ethylene vinyl alcohol (EVA), polyolefins, polyurethane, polyvinyl chloride (PVC), and polysiloxanes (silicones).

67. The method of claim 65 wherein the material of said outer layer is selected from materials of the group consisting of high and medium melt temperature copolymers, high melt temperature polyesters, high melt temperature polyethers, medium melt temperature polyethers and medium melt temperature polyamides.

68. The method of claim <sup>82</sup>65 wherein the material of the outer layer is selected from the group consisting of ABS (acrylonitrile-butadiene-styrene), ABS/nylon, ABS/polyvinyl chloride (PVC), ABS/polycarbonate and combinations thereof, acrylonitrile copolymer, polyacrylamide, polyacrylate, polyacrylsulfone, polyethylene terephthalate (PET), polybutylene terephthalate (PBT), polyethylene naphthalate (PEN), liquid crystal polymer (LCP), polyester/polycaprolactone polyester/polyadipate, polyetheretherketone (PEEK), polyethersulfone (PES), polyetherimide (PEI), polyetherketone (PEK), polymethylpentene, polyphenylene ether, polyphenylene sulfide, styrene acrylonitrile (SAN), nylon 6, nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12; and wherein the material of the inner layer is selected from the <sup>group</sup>~~class~~ consisting of ethylene propylene, ethylene vinylacetate and ethylene vinyl alcohol (EVA), polyolefins, polyurethane, polyvinyl chloride, and polysiloxanes (silicones).

69. The method of claim <sup>82</sup>65 wherein the material of the outer layer is selected from the group consisting of polyethylene terephthalate (PET), polyethylene naphthalate (PEN), nylon 6,

nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12.

70. The method of claim 66 wherein the material of the outer layer is selected from the group consisting of polyethylene terephthalate (PET), polyethylene naphthalate (PEN), nylon 6, nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12.

71. A method of forming a multi-layer expander member and attaching same to an intravascular catheter body comprising the steps of:

- (a) co-extruding an outer layer and an inner layer wherein the outer layer consists essentially of a polymeric film exhibiting high tensile strength and low distensibility, and an inner bonding layer consisting essentially of a polymeric film adhered to the outer tensile layer, forming therewith a layer combination, the inner bonding layer further being one which adheres readily to a catheter body using a method selected from the group consisting of melt bonding and glue adhesion or a combination thereof;
- (b) heating said parison to a predetermined temperature and drawing said parison longitudinally;
- (c) radially expanding said parison in a flow molding fixture to establish inflated dimensions;

- (d) wherein steps (b) and (c) are adapted to biaxially orient the material of both the tensile layer and the inner bonding layer such that the expander member exhibits a burst strength greater than about seven atmospheres;
- (e) coating the outer surface of the expander member with an hydrophilic lubricous plastic material; and
- (f) bonding the expander to the exterior of a tubular catheter.

72. The method of claim 71 wherein step (f) comprises bonding the expander to the exterior of a tubular catheter using an adhesive material.

73. The method of claim 71 wherein said inner layer has a lower melting point than that of said outer layer and wherein step (f) comprises bonding said expander to said catheter body by melt bonding of said inner layer.

74. The method of claim <sup>83</sup>71 wherein the hydrophilic lubricous plastic material is selected from the group consisting of polycaprolactam, polyvinylindol, vinyl pyrrolidone and hydrogels.

75. The method of claim <sup>83</sup>71 and wherein the inner bonding layer consists of a material selected from the group consisting of ethylene propylene, ethylene vinylacetate, vinylacetate and ethylene vinyl alcohol (EVA), polyolefins, polyurethane, polyvinyl chloride (PVC), and polysiloxanes (silicones).

76. The method of claim <sup>83</sup>71 wherein the material of said outer layer is selected from materials of the group consisting of high

and medium melt temperature copolymers, high melt temperature polyesters, high melt temperature polyethers, medium melt temperature polyethers and medium melt temperature polyamides.

F 77. The method of claim <sup>83</sup> 71 wherein the material of the outer layer is selected from the group consisting of ABS (acrylonitrile-butadiene-styrene), ABS/nylon, ABS/polyvinyl chloride (PVC), ABS/polycarbonate and combinations thereof, acrylonitrile copolymer, polyacrylamide, polyacrylate, polyacrylsulfone, polyethylene terephthalate (PET), polybutylene terephthalate (PBT), polyethylene naphthalate (PEN), liquid crystal polymer (LCP), polyester/polycaprolactone polyester/polyadipate, polyetheretherketone (PEEK), polyethersulfone (PES), polyetherimide (PEI), polyetherketone (PEK), polymethylpentene, polyphenylene ether, polyphenylene sulfide, styrene acrylonitrile (SAN), nylon 6, nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12; and wherein the material of the inner layer is selected from the <sup>group</sup> ~~class~~ consisting of ethylene propylene, ethylene vinylacetate and ethylene vinyl alcohol (EVA), polyolefins, polyurethane, polyvinyl chloride, and polysiloxanes (silicones).

F 78. The method of claim <sup>83</sup> 71 wherein the material of the outer layer is selected from the group consisting of polyethylene terephthalate (PET), polyethylene naphthalate (PEN), nylon 6, nylon 6/6, nylon 6/66, nylon 6/9, nylon 6/10, nylon 6/12, nylon 11 and nylon 12.